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FLOOD INSURANCE STUDY

MORGAN COUNTY, OHIO

UNINCORPORATED AREAS

NOVEMBER 2, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER 390420

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

MORGAN COUNTY,
UNINCORPORATED AREAS,
OHIO

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Unincorporated Areas of Morgan County, Ohio, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Dodson-Lindblom Associates, Inc. (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-87-C-2460. This study was completed in June 1988.

1.3 Coordination

On October 23, 1986, an initial meeting was held with representatives of FEMA, the Ohio Department of Natural Resources (ODNR), Morgan County, and the Study Contractor to determine the scope of the study. Various agencies and individuals were contacted for information on flood history and other hydrologic data.

The U.S. Army Corps of Engineers (COE) was contacted for flow information on the Muskingum River and for hydrologic information on Burr Oak Lake. Information needed to tie the Morgan County study into the Washington County study was coordinated with ODNR and FEMA. Similar information for Muskingum County was coordinated with FEMA and the Study Contractor. Local libraries and newspapers were researched for information on past flooding in the area.

On December 5, 1989, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Morgan County, Ohio. The area of study is shown on the Vicinity Map (Figure 1). The incorporated areas within the county were excluded from this study.

Flooding caused by overflow of the Muskingum River was studied in detail.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through June 1993. The scope and methods of study were proposed to and agreed upon by FEMA and Morgan County.

2.2 Community Description

Morgan County is in southeastern Ohio, approximately 60 miles southeast of Columbus, Ohio. It is bordered by Muskingum County on the north, Noble County on the northeast, Washington County on the southeast, Athens County on the southwest, and Perry County on the west. The population in Morgan County was reported to be 14,241 in 1980 (Reference 1).

About 15.4 percent of the county is devoted to cropland, 30.3 percent to pasture, 34.1 percent to woodlands, 16.2 percent to other farm land and farm facilities, and 4 percent to urban and other non-farm areas (Reference 2). Development is mainly along the Muskingum River, and is a blend of residential, industrial, and commercial concerns.

The climate of Morgan County is essentially continental in nature. Based on data for the Village of McConnelsville, average temperatures range from 28.3 degrees Fahrenheit (°F) in January to 73.5°F in July. Average precipitation at McConnelsville is 40.30 inches (Reference 3). The growing season is approximately 163 days at McConnelsville and extends from early May to the middle of October (Reference 4).

2.3 Principal Flood Problems

The Muskingum River flood of record in Morgan County occurred in March 1913, prior to the construction of the flood control dams in the Muskingum River Basin. The recurrence interval for the March 1913 flood without flood control structures is estimated to be about 300 years (Reference 5). Since the flood control dams in the Muskingum River Basin have been operational, the maximum stage on the Muskingum River recorded at McConnelsville occurred in March 1945 at 13.5 feet, approximately 9 feet

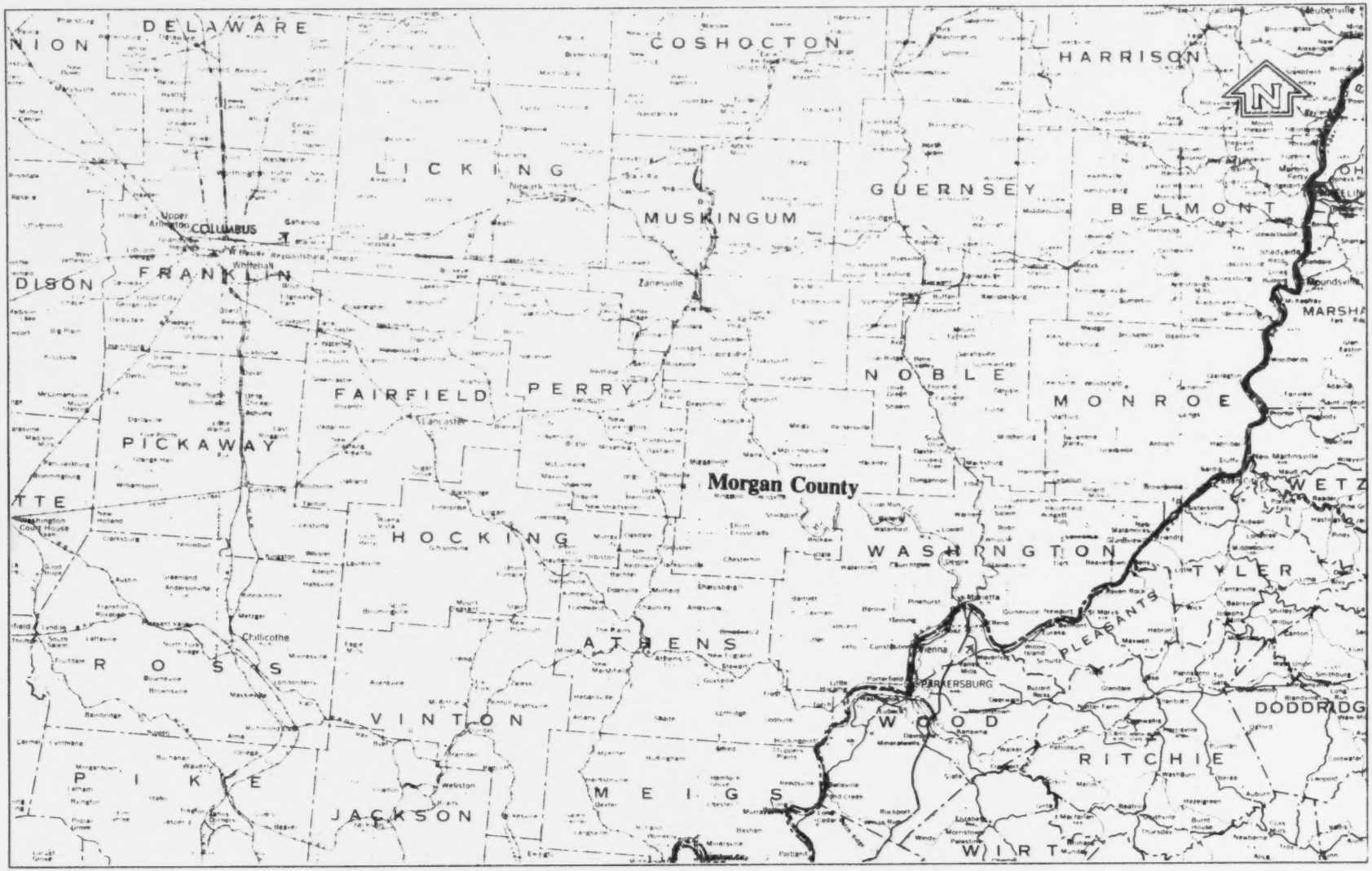


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MORGAN COUNTY, OH
(UNINCORPORATED AREAS)

APPROXIMATE SCALE

16 0 16 32 48 MILES

5

VICINITY MAP

above normal stage. The estimated recurrence interval for this storm with the flood control structures is about 100 years.

2.4 Flood Protection Measures

Flood protection for Morgan County along the Muskingum River is provided by a system of 16 flood control reservoirs built on upstream tributaries. Fourteen of these reservoirs were constructed between 1934 and 1938, with two additional reservoirs, Dillon Lake and North Branch Kokosing Lake, completed in 1961 and 1972, respectively. These reservoirs control approximately 68 percent of the total drainage area of the Muskingum River above McConnelsville. These reservoirs provide some protection against the 100-year flood.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40-percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60-percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

The 100-year flood discharges for the Muskingum River were obtained from the COE and were determined from flow frequency data obtained at various stream gaging stations on the Muskingum River.

Peak discharge-drainage area relationships for the 100-year flood of the Muskingum River are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 100-YEAR
MUSKINGUM RIVER		
at Roxbury	7,466	78,800
at McConnelsville	7,422	77,700

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross-section data for the backwater analysis on the Muskingum River were obtained from a COE dam break study for Wills Creek Lake (Reference 6) and additional field surveys along the Muskingum River. The State Route 266 bridge on the Muskingum River was surveyed to obtain elevation data and structural geometry. Similar information for the two bridges in McConnelsville was obtained from bridge construction plans provided by the Ohio Department of Transportation.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Roughness coefficients (Manning's "n" values) were estimated from field reconnaissance of the study area.

The 100-year flood elevations of the Muskingum River were computed utilizing the HEC-2 backwater computer program (Reference 7). The starting water-surface elevation was obtained from the Flood Insurance Study for Washington County, Ohio (Reference 8).

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 and a contour interval of 20 feet (Reference 9).

The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary was delineated using the Flood Hazard Boundary Map for the Unincorporated Areas of Morgan County, Ohio (Reference 10).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways for this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 2, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than 1.0-foot increase in the base flood elevations at any point within the community.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot surcharge at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

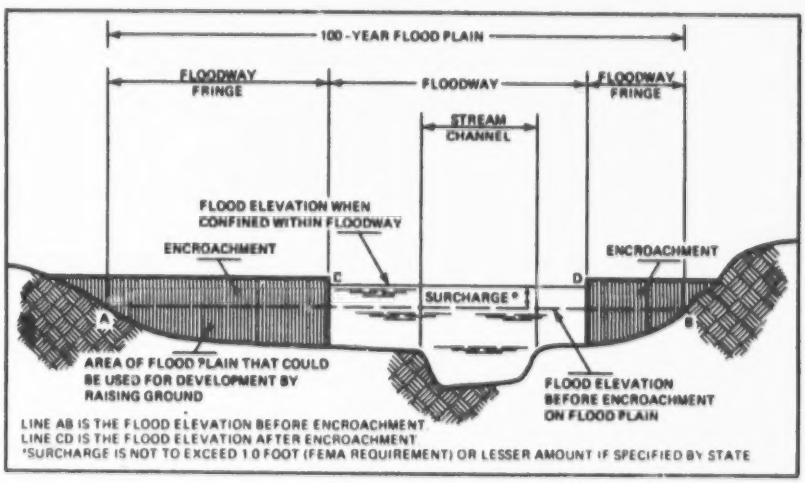

100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
MUSKINGUM RIVER								
A	29.26	1226[2]	23,012	3.4	640.4	640.4	641.4	1.0
B	29.55	1156[2]	20,074	3.9	640.5	640.5	641.5	1.0
C	30.13	998[2]	21,400	3.6	641.0	641.0	642.0	1.0
D	30.75	650[2]	17,922	4.4	641.3	641.3	642.3	1.0
E	31.48	550[2]	16,671	4.7	641.7	641.7	642.7	1.0
F	31.96	710[2]	17,239	4.5	642.0	642.0	643.0	1.0
G	32.48	636[2]	17,577	4.4	642.3	642.3	643.3	1.0
H	32.85	715[2]	17,326	4.5	642.5	642.5	643.5	1.0
I	33.23	465[2]	14,601	5.3	642.7	642.7	643.7	1.0
J	33.75	950[2]	18,577	4.2	643.1	643.1	644.1	1.0
K	34.05	825[2]	23,730	3.3	643.5	643.5	644.5	1.0
L	34.17	510[2]	14,028	5.6	644.8	644.8	645.6	0.8
M	34.44	545[2]	13,979	5.6	645.0	645.0	645.8	0.8
N	36.76	515	13,613	5.8	647.7	647.7	648.5	0.8
O	37.90	546	15,978	4.9	649.3	649.3	650.1	0.8
P	38.90	467	13,910	5.7	650.3	650.3	651.0	0.7
Q	39.99	675[3]	19,106	4.1	651.5	651.5	652.3	0.8
R	41.06	473	12,306	6.4	654.9	654.9	655.5	0.6
S	41.89	416	11,433	6.9	656.4	656.4	657.1	0.7
T	42.96	492	15,049	5.2	658.2	658.2	658.9	0.7
U	43.25	409	13,982	5.6	658.5	658.5	659.2	0.7
V	44.71	430	12,687	6.2	660.1	660.1	660.9	0.8
W	46.35	495	13,109	6.0	662.7	662.7	663.4	0.7
X	47.74	507	16,503	4.8	664.3	664.3	665.1	0.8
Y	48.55	660	16,511	4.8	665.0	665.0	665.9	0.9
Z	49.19	503[3]	15,273	5.2	665.6	665.6	666.5	0.9

[1]MILES ABOVE MOUTH
[2]THIS WIDTH EXTENDS BEYOND COUNTY BOUNDARY
[3]THIS WIDTH EXTENDS WITHIN AREA NOT INCLUDED

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MORGAN COUNTY, OH
(UNINCORPORATED AREAS)

FLOODWAY DATA

MUSKINGUM RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
MUSKINGUM RIVER								
AA	52.09	442	14,197	5.5	670.5	670.5	671.4	0.9
AB	52.90	745	17,332	4.5	671.5	671.5	672.3	0.8
AC	54.08	576	18,511	4.2	672.3	672.3	673.2	0.9
AD	55.17	483	13,912	5.6	673.2	673.2	674.1	0.9
AE	56.15	545	17,256	4.5	674.2	674.2	675.1	0.9
AF	57.07	672	19,308	4.0	674.9	674.9	675.8	0.9
AG	58.10	548	16,742	4.6	676.1	676.1	677.1	1.0
AH	59.31	457	12,163	6.4	677.4	677.4	678.3	0.9

[1]MILES ABOVE MOUTH

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MORGAN COUNTY, OH
(UNINCORPORATED AREAS)

FLOODWAY DATA

MUSKINGUM RIVER

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

The 100-year elevations shown for the Muskingum River in the Flood Insurance Study published for Muskingum County, Ohio (Reference 11) are 2 feet higher than the elevation at the county boundary shown in this study. This is caused by the use of the HEC-2 analyses for this study while those in Muskingum County are based on historical data.

The Flood Insurance Study published for the Unincorporated Areas of Washington County, Ohio (Reference 8) is in agreement with this study.

The Flood Insurance Rate Maps printed for the Unincorporated Areas of Noble County, Ohio and the Villages of McConnelsville, Malta, and Stockport, Ohio (References 12-15) are in agreement with this study.

The Flood Insurance Study in progress for the Unincorporated Areas of Athens County, Ohio (Reference 16) is in agreement with this study.

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for Morgan County, Ohio (Reference 10).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 175 West Jackson Boulevard, 4th Floor, Chicago, Illinois 60604-2698.

Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To ensure that any user is aware of all revisions, it is advisable to contact the map repository of flood hazard data located in the community.

9.0 REFERENCES AND BIBLIOGRAPHY

1. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Ohio, Washington, D.C., February 1982.

2. State of Ohio, Department of Natural Resources, Division of Water, Report No. 21, Water Inventory of the Muskingum River Basin, 1968.

3. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climatological Data - Annual Summary - Ohio, Volume 90, Number 13, 1985.

4. Ruffner, James A., Climates of the States, Volume 2, Gale Research Company, 1978.

5. U.S. Army Corps of Engineers, Project Manual for Water Control Management - Dover Dam, 1985.

6. ————, Dam Failure Study Report - Wills Creek Lake, May 1983.

7. ————, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles Generalized Computer Program, Davis, California, November 1976.

8. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Washington County, Unincorporated Areas, Ohio, February 1981.

9. U.S. Geological Survey, 7.5-Minute Series Topographic Map, Scale 1:24000, Contour Interval 20 Feet: Beverly, Ohio, 1961 (photorevised 1975); Corning, Ohio, 1961 (photorevised 1975); McConnelsville, Ohio, 1961 (photorevised 1975); Philo, Ohio, 1961 (photorevised 1975); Ringgold, Ohio, 1961 (photorevised 1975); Rokeby Lock, Ohio, 1961 (photorevised 1975); Stockport, Ohio, 1961 (photorevised 1975).

10. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Morgan County, Unincorporated Areas, Ohio, March 1977.

11. Federal Emergency Management Agency, Flood Insurance Study, Muskingum County, Unincorporated Areas, Ohio, June 1988.

12. ————, Flood Insurance Rate Map, Noble County, Unincorporated Areas, Ohio, January 1988.

13. ————, Flood Insurance Rate Map, Village of McConnellsville, Morgan County, Ohio, July 1987.

14. ————, Flood Insurance Rate Map, Village of Malta, Morgan County, Ohio, September 1987.

15. ————, Flood Insurance Rate Map, Village of Stockport, Morgan County, Ohio, August 1987.

16. ————, Flood Insurance Study, Athens County, Unincorporated Areas, Ohio, in progress.

U.S. Geological Survey, Water-Supply Paper No. 1839, Roughness Characteristics of Natural Channels, Barnes, Harry H., Jr., 1967.

Chow, Ven Te, Open-Channel Hydraulics, Sixth Edition, New York: McGraw-Hill Book Company, Inc., 1959.

Ohio Bureau of Employment Services, personal telephone conversation with Jim Adams, June 14, 1988.

U.S. Army Corps of Engineers, Hydrologic Engineering Center, Application of the HEC-2 Bridge Routines, Training Document No. 6, June 1974.

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0225	639.95	Ohio Department of Highways standard disk set in west downstream corner of State Route 266 bridge over Olney Run
2	0225	653.95	U.S. Coast and Geodetic Survey disk stamped "G237 1959" set vertically 2.5 feet above ground in north face of rock cut located 9 feet south of abandoned railroad, 60 feet southeast of milepost 39-17
3	0225	661.04	U.S. Coast and Geodetic Survey disk stamped "J237 1959" set in top of concrete post projecting 4 inches above ground located 2 feet south of milepost 38-20 on abandoned railroad on sharp curve, about 83 feet northwest of centerline of farm road
4	0200	660.08	U.S. Coast and Geodetic Survey disk stamped "L237 1959" set in top of concrete post projecting 4 inches above ground located at milepost 37-03 of abandoned railroad, 8 feet southeast of centerline of private road
5	0200	655.52	U.S. Coast and Geodetic Survey disk stamped "M237 1959" set vertically 1 foot above ground in southeast face of rock ledge 15 feet long by 4 feet high, 6 feet southwest of northeast end of ledge, 47 feet southwest of abandoned railroad at milepost 36-08
6	0200	682.83	U.S. Coast and Geodetic Survey disk stamped "N237 1959" set vertically 1.5 feet above paved road in northeast face of rock cut 225 feet long by 35 feet high, at southeast end, directly under highest part of ledge, 14 feet southwest of road centerline, about 800 feet northwest along road from abandoned railroad crossing at milepost 35-04

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
7	0200	652.70	U.S. Coast and Geodetic Survey disk stamped "P237 1959" set in top of concrete wall projecting towards river from office building at Farm Bureau Coop Mill, 3 feet west of east end of wall, 122 feet east of abandoned railroad
8	0200	683.38	U.S. Coast and Geodetic Survey disk stamped "E246 1959" set in top of concrete post projecting 2 inches located 4.1 feet west of southwest corner of southwesternmost of three wooden hangars at Ervin Airport, 16 feet northwest of gravel road
9	0200	665.38	U.S. Coast and Geodetic Survey disk stamped "F246 1959" located in northeast face of 5 feet high by 70 feet long rock cut at foot of hill, set vertically 3 feet below top edge of rock, 7.9 feet southwest of abandoned railroad, 0.6 mile southeast of paved road crossing
10	0200	658.69	U.S. Coast and Geodetic Survey disk stamped "G246 1959" set in top of concrete post projecting 3 inches, located 15 feet east of abandoned railroad, 0.4 mile north of paved road crossing railroad, 37 feet southwest of milepost 31+18
11	0200	660.13	U.S. Coast and Geodetic Survey disk stamped "J246 1959" set in top of south corner of concrete catch basin located 15 feet southwest of centerline of paved road, 7.3 feet northeast of abandoned railroad between mileposts 30+3 and 30+4

ELEVATION REFERENCE MARKS

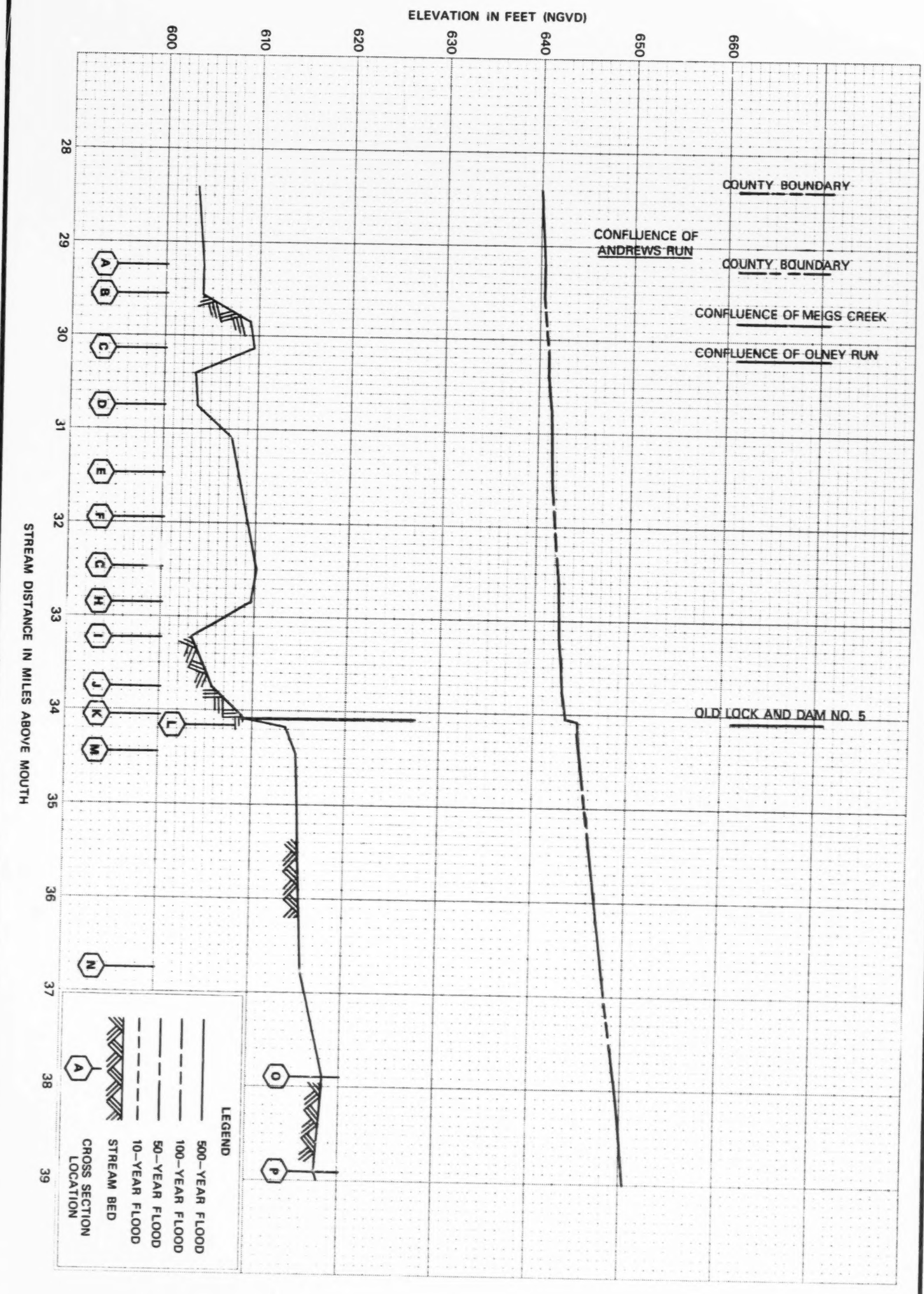
REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
12	0200	657.64	U.S. Coast and Geodetic Survey disk stamped "K246 1959" set in top of concrete post projecting 2 inches, located 24 feet southwest of centerline of paved road parallel to abandoned railroad, 2 feet north of milepost 29+3
13	0200	668.56	U.S. Coast and Geodetic Survey disk stamped "L246 1959" set in top northwest end of northeast headwall of 84-inch culvert under County Route 2, 90 feet west of County Route 2 crossing of abandoned railroad
14	0100	688.82	U.S. Coast and Geodetic Survey disk stamped "M246 1959" set in top of concrete post projecting 3 inches above ground located 35 feet north of centerline of drive leading west to Shamrock Ranch, 13 feet east of abandoned railroad
15	0100	673.73	U.S. Coast and Geodetic Survey disk stamped "P246 1959" set in top of concrete post projecting 5 inches, 28.8 feet southwest of abandoned railroad between mileposts 25+19 and 25+20, located 24 feet southeast of crossing sign 5264
16	0100	670.68	U.S. Coast and Geodetic Survey disk stamped "Q246 1959" set vertically in northeast face of concrete foundation of Malta Manufacturing Company Plant No. 2, about 34 feet southwest of abandoned railroad, 1.6 feet west of northeast corner of building

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
17	0100	681.73	U.S. Coast and Geodetic Survey disk stamped "T246 1959" set in top of concrete post projecting 3 inches above ground located 113 feet east of east corner of stone foundation of farmhouse, 52 feet south of, abandoned railroad track from milepost 23+7
18	0075	676.50	U.S. Coast and Geodetic Survey disk stamped "V246 1959" set in top of east end of north abutment of abandoned railroad bridge over Oilspring Run
19	0075	714.69	U.S. Coast and Geodetic Survey disk stamped "X246 1959" set in top of concrete post projecting 3 inches above ground located 41 feet north of north end of west headwall of 36-inch culvert under abandoned railroad, 145 feet southwest of milepost 20
20	0075	685.31	U.S. Coast and Geodetic Survey disk stamped "B238 1959" on a copper-coated steel rod projecting 3 inches, located 9 feet southeast of crossing post 5253, about 49 feet southeast of abandoned railroad milepost 18+11, about 0.2 mile southeast of railroad bridge over Island Run
21	0075	694.74	U.S. Coast and Geodetic Survey disk stamped "B247 1959" set in top of concrete post projecting 3 inches located 6 feet southwest of abandoned railroad milepost 17+10, about 72 feet southwest of south corner of wooden church building, 16.2 feet northeast of northeast rail

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
22	0075	680.63	U.S. Coast and Geodetic Survey disk stamped "A247 1959" set in top of southeast end of southwest abutment of abandoned railroad bridge over Big Bottom Run
23	0025	694.48	U.S. Coast and Geodetic Survey disk stamped "C247 1959" set in top of concrete post projecting 3 inches located 90 feet southeast of southeast corner of farmhouse, 46 feet west of abandoned railroad milepost 15+7



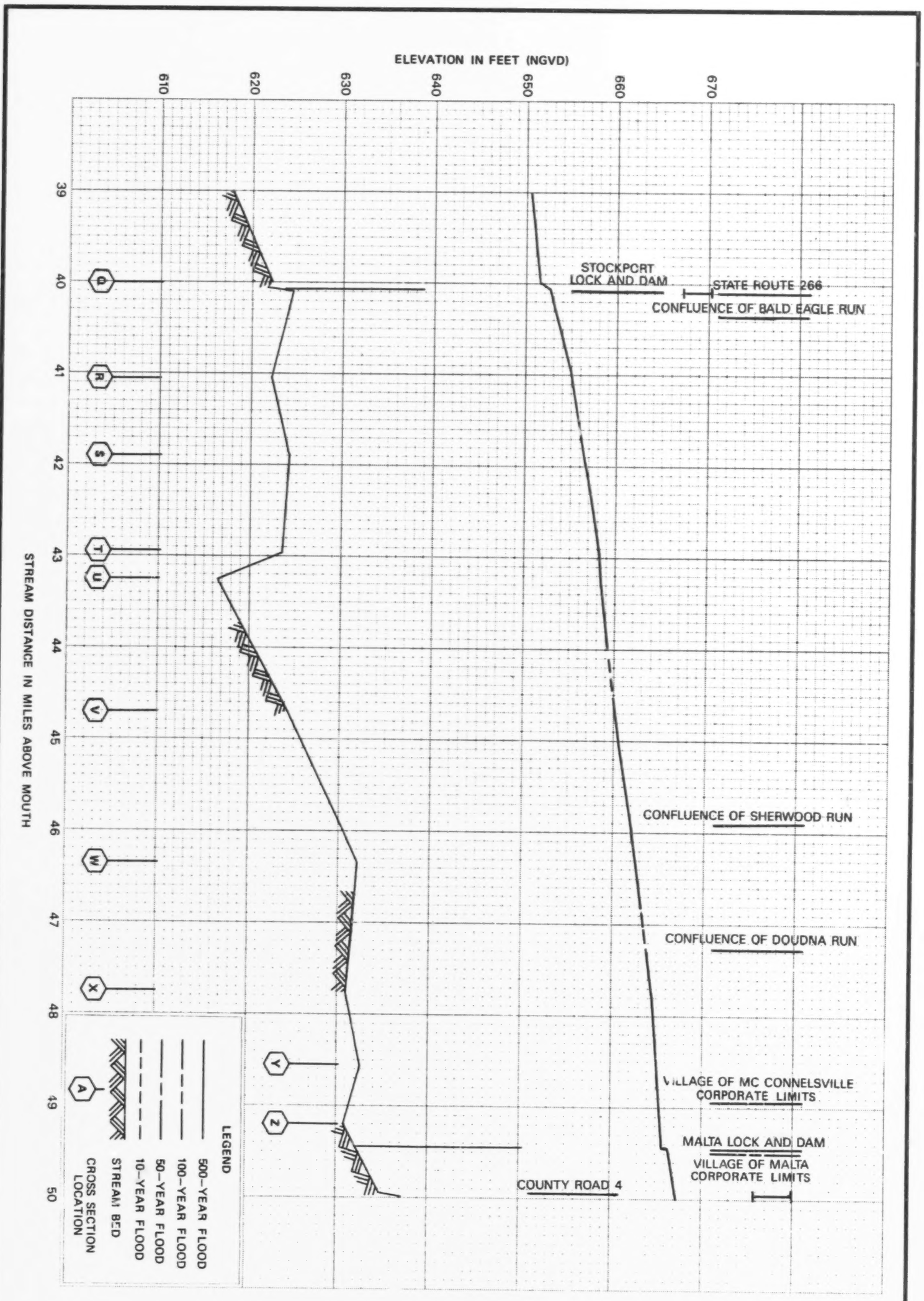
FEDERAL EMERGENCY MANAGEMENT AGENCY

MORGAN COUNTY, OH
(UNINCORPORATED AREAS)

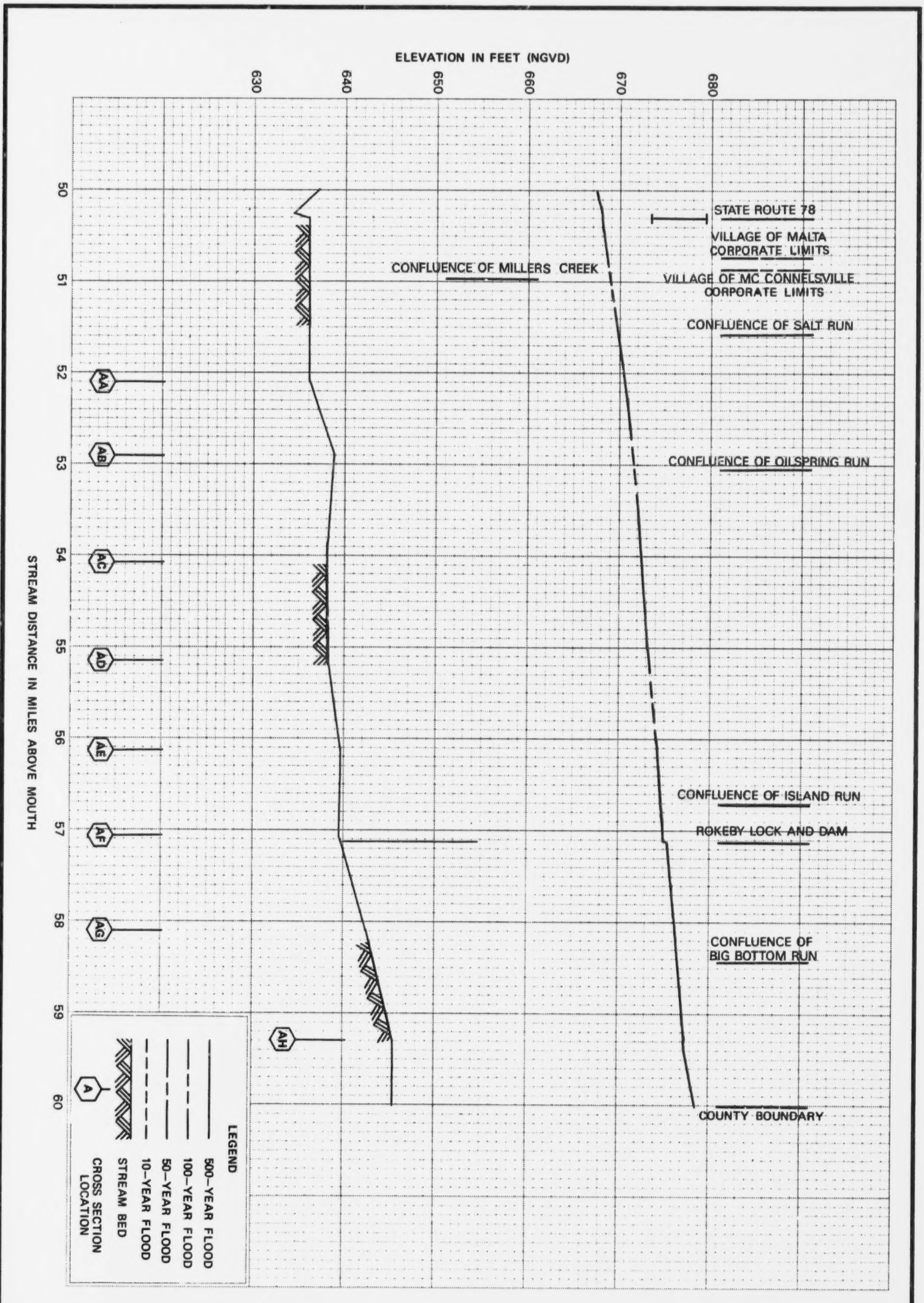
FLOOD PROFILES

MUSKINGUM RIVER

01P



02P	FEDERAL EMERGENCY MANAGEMENT AGENCY **MORGAN COUNTY, OH** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **MUSKINGUM RIVER**



03P

FEDERAL EMERGENCY MANAGEMENT AGENCY

MORGAN COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

MUSKINGUM RIVER